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(56) Documents Cited

**GB 2176639 A**

(58) Field of Search

**UK CL (Edition P ) G4H HNEC HNED HNEE HNEF**  
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## (54) Allocating addresses to addressable devices

(57) A method of setting addresses in an electrical apparatus comprising a plurality of devices (3) monitored and/or controlled by signals applied to a circuit from a control unit (1) comprises: installing each device; performing an operation at each device which causes a signal to be sent to the control unit; sending a signal from the control unit to the device indicative of an address, setting that address at the device; and then moving on to the next device, at which the process is repeated but a different address is allocated. The operation may be of actuating an input (4), eg a fire or smoke sensor, or may be the physical insertion or removal of a device.

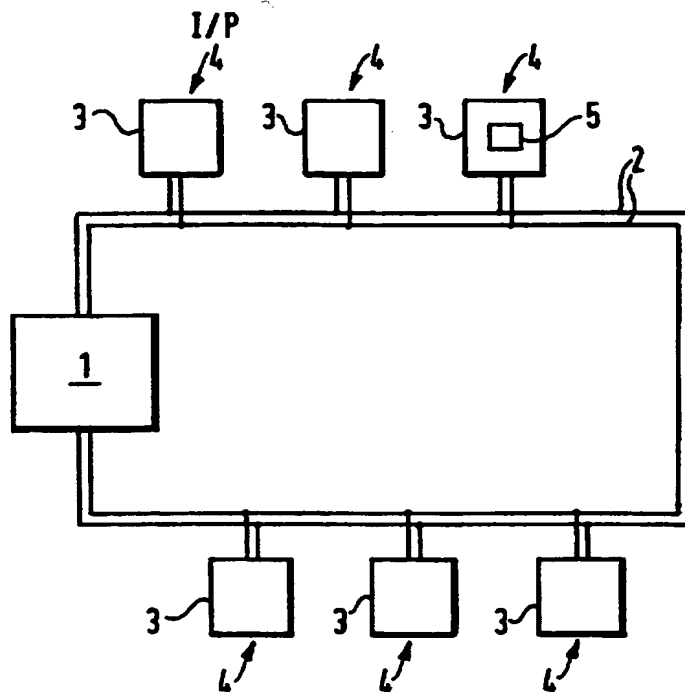


Fig.1.

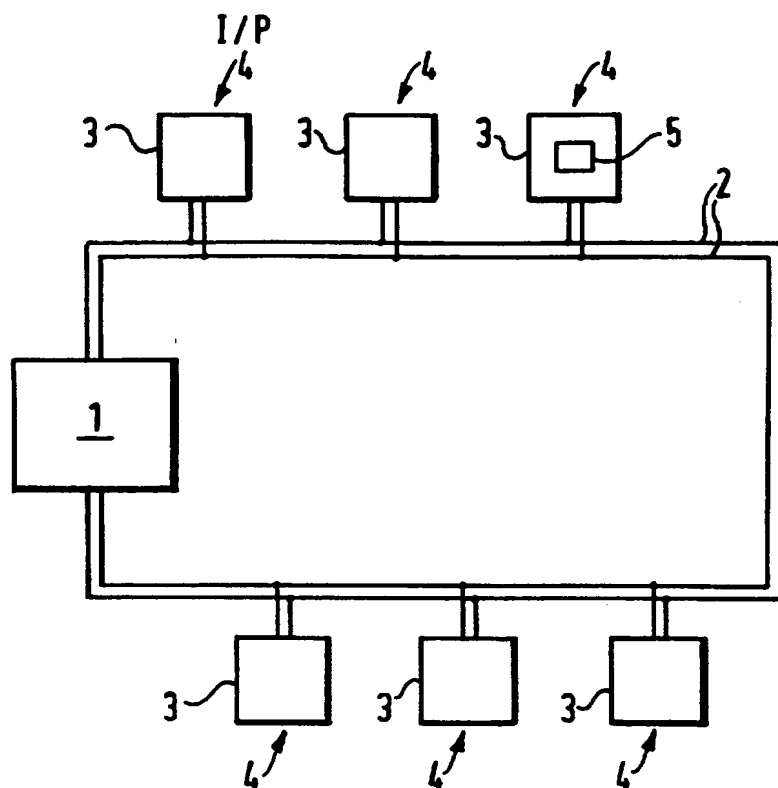


Fig.1.

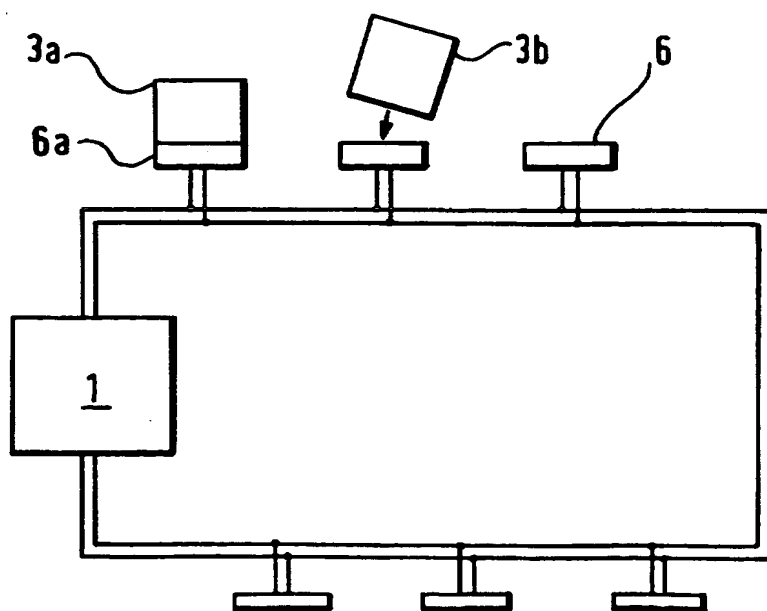


Fig.2.

ALLOCATING ADDRESSES TO ADDRESSABLE DEVICES

This invention relates to allocating addresses to addressable devices. In particular, it relates to devices in a system in which a plurality of devices are connected to a circuit and require addressing in order to monitor or control these devices. The circuit on which the devices are connected generally carries power and communication signals to the devices and often uses just one pair of wires. Typical of such devices are addressable fire detection systems and addressable emergency lighting test systems. However, the present invention is applicable also to other types of systems.

In such systems, each device on the circuit or pair of wires is provided with a unique address so that a control unit, by providing signals specific to a certain address, only addresses the device at that address. There are several methods which are known to set addresses in each device. The most common of these include the following: A first method uses a series of switches in each device, such that the combination of switch settings defines a particular address. Another method involves plugging in a key, either electrical or mechanical, which makes a series of connections in the device which can be interpreted as address. A further method involves connecting each device to an off-line addressing device, either at the factory or on site to electrically set the address. Alternatively, each device may be manufactured with a unique serial number or in a yet further known alternative a switch may be included in each device so that only one device is connected to the control panel at a time. In this sort of system, the control panel sets the address and tells the unit to connect the next device via the switch.

There are various advantages and disadvantages associated with each of these, and other, techniques but

none are wholly satisfactory in all respects.

GB 2 176 639 A discloses a system in which a central control unit interrogates devices in turn and, if a new device having a preset poll number zero is found,  
5 assigns it a new polling number.

The present invention arose in an attempt to provide an improved method for the addressing of devices.

According to the present invention there is provided a method of setting addresses in an electrical  
10 apparatus comprising a plurality of devices connected to a circuit, which devices are monitored and/or controlled by signals applied to the circuit, and wherein each device is provided with an address, which method of setting each address comprises installing each device; performing an  
15 operation locally at each device which causes a signal to be sent to the control unit; sending a signal from the control unit to the device indicative of an address and setting that address at the control unit.

Each device in turn may be sequentially operated  
20 on to set its address, the addresses being incremented by the control unit.

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

25 Figure 1 shows schematically an electrical system comprising a control unit and a plurality of devices connected on a two wire bus to the control unit; and

30 Figures 2 shows a system having a control unit and a number of mounting terminals connected to a two wire bus, devices to be controlled by the control unit being mounted upon the mounting terminals.

Addressing methods according to the present invention will now be described with reference to the  
35 figures.

In systems according to the invention, a plurality of electrical devices are arranged to be connected to a central control unit 1, preferably on a two wire bus type system, so that they can receive control and monitoring signals from control unit 1. The devices may be such devices as addressable fire detection, monitoring or sounding devices, emergency lights or emergency light testing points, or many other types of devices. Each of the devices 2 is provided with a means for storing an address, which address will generally be unique on a system such that each device connected to the control unit has a different address.

In one embodiment of the invention each device is initially preset with a non-valid address, such as '00' for example. This may be done at the factory for convenience.

In the embodiment of Figure 1, each device, after being preset with a non-valid address code is mounted into position on a bus 2 extending from and to a control unit 1. Six devices 3 are shown in Figure 1. The devices are installed and the integrity of their electrical connection can be tested from the control equipment, using a DC current monitor built into the equipment, or a simple electrical meter can be used to check continuity and polarity of the connections, or other methods may be used. The control panel, which will generally include a microprocessor, memory means and electronic input/output means is then put into a programming mode and an initial start address is set. This is the first address to be loaded into one of the devices and for example might be '01'.

The devices are mounted remotely from the control unit, spaced over a room or a building for example and in embodiments of the invention an engineer attends each device in turn to enable the address to be set. He

attends the first device and operates an input 4 to the device. The input will usually be the sensing part of a fire detector, smoke detector, etc or may be a test key where the device is a emergency call point for example.

5 Thus, the engineer performs some action which causes the device to emit a signal, such as an emergency warning or other signal, to the control unit. This may done by using a test key where the device is a call point, a smoke pole where the device a smoke detector, a heat gun where the

10 device is a heat detector and so on. In response to this, a device which is properly functioning gives an indication that it has operated (for example by luminating an LED on its body) and sends a defined signal, such as a pulse, to the control panel over the electrical connections and bus

15 2.

The control panel, on receiving the defined signal, operates an output to indicate that the signal has been seen and in turn sends a signal back to the device to specifically tell it what its address is (eg '01'). Thus,

20 for the first device that is actuated, the address output will be the first address available. Each device is provided with a memory 5, which may be battery backed up RAM, EEROM or any other type of memory, and preferably sends a confirmation signal back to the control panel.

25 The control panel may be operated to send a further (or the same) output to indicate that the device has been correctly addressed and resets a detection loop, causing the device to turn off its active indication and to increment the controller to the next address to be

30 programmed (eg to '02'). Alternatively, the specific reset may be emitted if the panel and the device are both arranged to move onto the next stage automatically.

The engineer then sees the output on the control panel and the indication on the device and uses this as

35 feedback that the device has operated and that it has been

programmed with the correct address. He then moves onto the next device.

5 The next device in turn is then actuated by causing its respective input to operate and this in turn causes the control unit to send the next address (eg '02') to this device. The process can then be repeated across all the devices, each of which in turn receives the unique new address from the control unit. By starting at the first address and moving sequentially from one device to the text, the engineer can set all the address on the system.

10 By arranging that each device is initially set with a non-valid address value (such as '00'), the control panel can be programmed such that it only sets the address of a detector which has no current address. This can avoid errors where the engineer inadvertently operates the same device twice.

15 A facility may be provided which enables the particular address which is set for a specific device to be cancelled. This may be necessary if a device is set to the wrong address and the cancellation signal may be sent from the control panel. The correct address can then be set using the above described technique or, alternatively, one address can be set to be a different address from the control panel.

20 Means are provided such that the control panel checks the system information to ensure that no two devices can be set to the same address and can check each device that is addressed to make sure it is the correct type (eg where there are a plurality of different types of devices mounted on the same circuit), compared with a schedule which may be stored in the controller's memory. The schedule may be prestored or may be stored during programming of the address. Thus, it may be desired that addresses 00 to 04 are for smoke detectors and that

addresses 05 to 08 are for heat detectors, etc so that if one of these is wrongly accessed in the sequence, by returning signals to the control unit of the type of device it is, the control unit can ignore that device when  
5 setting the next address and the engineer then knows to revert to that device at the correct time.

Figure 2 shows a system in which the devices are of the type which are arranged to connect, usually by a quick connect means, to a terminal, such as a mounting  
10 point. This would be normal for fire detectors for example. In the example shown in Figure 2, each device 3 is mounted upon a respective terminal/mounting device 6. In an embodiment of the invention, after all the terminals 6 are connected the wiring of the system is firstly  
15 checked. The control unit 1 is then set into address programming mode and then each device is fitted, one at a time. The figure shows a first device 3 mounted upon a first terminal 6a and a second device about to be fitted. The remaining devices have not yet been fitted. The  
20 control panel and electrical bus 2 are actuated while the devices are being fitted such that as each device in turn is mounted upon a respective terminal, a signal is generated from the device to the control panel indicating that a device is successfully connected. The device may  
25 alternatively, or additionally, provide its own visual/audible feedback such as LEDs or an audible warning mounted on it which indicates that correct connection has been made. Confirmation that an address has been accepted could also be achieved via the normal system sounders  
30 giving a short pulse or output. Alternatively, a signal could be sent to a radio pager or as a paging signal. Other methods of confirming acceptance may be used.

As each device in turn is correctly connected and sends an appropriate signal to the control unit, the  
35 control unit sends that device the next available address



code, which is stored in the device. Figure 2, for example, shows a system in which the first device 3a has been successfully connected and may have been allocated the address '01'. The second device 3b is being mounted  
5 and, once mounted, will be allocated the address '02'.

In some types of systems, for example emergency lighting test systems, not all devices have an input. In this case, the method of connection of Figure 2 can be particularly valuable. Alternatively, a specific  
10 addressing button, switch or other input can be added to the device, or a specific means of operation may be used to set addressing. For example, the operation of removing the lamp from an emergency lighting device may be used to send an appropriate signal to control unit of the devices  
15 present in an addressing cycle so the control unit can send back an appropriate address. Many other alternative will be apparent.

Although embodiments of the present invention necessitate an engineer, or other user, physically  
20 attending each device in turn to enable the addresses to be set, it should be borne in mind that under current regulations each device of an installation has to be manually inspected to ensure it is operating correctly. In the case of fire systems, each device must be operated  
25 to fully demonstrate that it is working correctly. Thus, the addressing of the system can be carried out at the same time as this inspection, requiring minimal extra effort.

Some types of system allow a description of the  
30 location to be entered against each address. This allows a user to see a description of precisely where the fire, fault or other incident is, rather than just to see a number or a flashing light for example. The activity of checking addresses against location is facilitated with  
35 embodiments of the present invention in that the location

can be verified when a device is inspected/operated. This may be done by referring manually to a printed sheet or a portable terminal for example. The description may also be entered into a terminal when testing the device and any  
5 information may be sent back to the panel for storage. This may be done by wireless means, such as by radio frequency transmission to the panel, or by infrared transmission to the device or by other means such as temporary wiring connection. Alternatively, the  
10 information may be stored in a portable apparatus, such as portable computer or terminal and then downloaded into the panel when all or some of addressing information has been set.

It is often required to remove a device from a  
15 system for repair, cleaning, replacement of batteries or lamps or the like. In a modification, the control panel is provided with a further facility wherein an engineer indicates that one or more devices will be replaced. He then goes to each relevant device, removes it and replaces  
20 it with a new or refurbished device. The control unit is then arranged, upon the triggering operation being performed, eg installation of the device of actuation of an input at the device, to give the new unit the same address as the unit which was removed. Thus, units will  
25 usually not be replaced sequentially, but the panel is adapted to sense (or be told) a unit is removed and when it sees a new unaddressed unit connected it allocates it the address of the removed unit.

CLAIMS

1. A method of setting addresses in an electrical apparatus comprising a plurality of devices connected to a circuit, which devices are monitored and/or controlled by signals applied to the circuit, and wherein each device is provided with an address, which method of setting each address comprises installing each device; performing an operation locally at each device which causes a signal to be sent to the control unit; sending a signal from the control unit to the device indicative of an address and setting that address at the control unit.
2. A method as claimed in Claim 1, further comprising sequentially setting the address of each device in turn, the control unit being arranged to increment the sent address as each device is set in turn, so that each device is allocated a different address.
3. A method as claimed in Claim 1 or Claim 2, wherein the operation comprises actuating an input to the device.
4. A method as claimed in Claim 3, wherein the input is the sensing part of a detector, a test input, or a dedicated address-setting input.
5. A method as claimed in Claim 1 or Claim 2, wherein the operation comprises the setting or removal of a device into or out of position.
6. A method as claimed in any of the preceding claims, wherein cancellation and/or reset means are provided.
7. A method as claimed in any of the preceding claims, wherein each device is adapted to send a confirmation signal to the control unit after having its address set.
8. A method as claimed in any of the preceding claims, wherein the operation is performed or instigated by a human operator attending each device in turn.

9. A method as claimed in any of the preceding claims, wherein if a device is removed, the control unit is arranged to allocate the address of the removed unit to a new unit installed in the apparatus.

5 10. A method of setting addresses, which method is substantially as hereinbefore described with reference to, and as illustrated by, the accompanying drawings.



Application No: GB 9722606.2  
Claims searched: 1-10

Examiner: Mike Davis  
Date of search: 16 January 1998

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.P): G4H (HNEC,HNED,HNEE,HNEF,HNEM)

Int CI (Ed.6): H04Q

Other:

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2176639 A (MARS) eg page 3 lines 25-74 and page 5 line 68 to page 6 line 77, the local operation claimed being the operation of responding to the request for poll number zero (page 5 lines 100-107).	1 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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